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ENVIRONMENTAL PROTECTION AGENCY

■

PROPOSED EFFLUENT LIMITATIONS GUIDELINES

Organic Chemicals Manufacturing Industry

ENVIRONMENTAL PROTECTION AGENCY

[40 CFR Part 414]

EFFLUENT LIMITATIONS GUIDELINES FOR EXISTING SOURCES AND STANDARDS OF PERFORMANCE AND PRETREATMENT STANDARDS FOR NEW SOURCES FOR THE ORGANIC CHEMICALS MANUFACTURING INDUSTRY POINT SOURCE CATEGORY

Notice of Proposed Rule-Making

Notice is hereby given that effluent limitations guidelines for existing sources and standards of performance and pretreatment standards for new sources set forth in tentative form below are proposed by the Environmental Protection Agency (EPA) for the nonaqueous processes subcategory (Subpart A), processes with process water contact as steam diluent or absorbent subcategory (Subpart B), aqueous liquid phase reaction systems subcategory (Subpart C), and batch and semicontinuous processes subcategory (Subpart D) of the organic chemicals manufacturing category pursuant to sections 301, 304(b), 304(c), 306(b) and 307(c) of the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251, 1311, 1314(b) and (c), 1316 (b) and 1317(c); 86 Stat. 816 et seq.; Pub. L. 92–500) (the "Act").

(a) *Legal authority* — (1) Existing point sources. Section 301(b) of the Act requires the achievement by not later than July 1, 1977, of effluent limitations for point sources, other than publicly owned treatment works, which require the application of the best practicable control technology currently available as defined by the Administrator pursuant to section 304(b) of the Act. Section 301 (b) also requires the achievement by not later than July 1, 1983, of effluent limitations for point sources, other than publicly owned treatment works, which require the application of best available technology economically achievable which will result in reasonable further progress toward the national goal of eliminating the discharge of all pollutants, as determined in accordance with regulations issued by the Administrator pursuant to section 304(b) of the Act.

(2) Section 304(b) of the Act requires the Administrator to publish regulations providing guidelines for effluent limitations setting forth the degree of effluent reduction attainable through the application of the best practicable control technology currently available and the degree of effluent reduction attainable through the application of the best control measures and practices achievable including treatment techniques, process and procedure innovations, operating methods and other alternatives. The regulations proposed herein set forth effluent limitations guidelines, pursuant to section 304(b) of the Act, for the nonaqueous processes subcategory (Subpart A); processes with process water contact as steam diluent or absorbent subcategory (Subpart B), aqueous liquid phase reaction systems subcategory (Subpart C), and batch and semicontinuous processes subcategory (Subpart D) of the organic chemicals manufacturing category.

(3) New sources. Section 306 of the Act requires the achievement by new sources of a Federal standard of performance providing for the control of the discharge of pollutants which reflects the greatest degree of effluent reduction which the Administrator determines to be achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives including where practicable, a standard permitting no discharge of pollutants.

Section 306(b)(1)(B) of the Act requires the Administrator to propose regulations establishing Federal standards of performance for categories of new sources for the nonaqueous processes subcategory (Subpart A), processes Act. The Administrator published in the FEDERAL REGISTER of January 16, 1973, (38 FR 1624) a list of 27 source categories, including the organic chemicals manufacturing category. The regulations proposed herein set forth the standards of performance applicable to new sources for the nonaqueous processes subcategory (Subpart A), processes with process water contact as steam diluent or absorbent subcategory (Subpart B), aqueous liquid phase reaction systems subcategory (Subpart C), and batch and semicontinuous processes subcategory (Subpart D) of the organic chemicals manufacturing category.

Section 307(c) of the Act requires the Administrator to promulgate pretreatment standards for new sources at the same time that standards of performance for new sources are promulgated pursuant to section 306. Sections 414.15, 414.25, 414.35 and 414.45 proposed below provide pretreatment standards for new sources within the nonaqueous processes subcategory (Subpart A), processes with process water contact as steam diluent or absorbent subcategory (Subpart B), aqueous liquid phase reaction systems subcategory (Subpart C), and batch and semicontinuous processes subcategory (Subpart D) of the organic chemicals manufacturing category.

Section 304(c) of the Act requires the Administrator to issue to the States and appropriate water pollution control agencies information on the processes, procedures, or operating methods which result in the elimination or reduction of the discharge of pollutants, to implement standards of performance under section 306 of the Act. The Development Document referred to below provides, pursuant to section 304(c) of the Act, information on such processes, procedures, or operating methods.

(b) *Summary and basis of proposed effluent limitations guidelines for existing sources and standards of performance and pretreatment standards for new sources*—(1) General methodology. The effluent limitations guidelines and standards of performance proposed herein were developed in the following manner. The point sources category was first studied for the purpose of determining whether separate limitations and standards are appropriate for different segments within the category. This analysis included a determination of whether differences in raw material used, product produced, manufacturing process employed, age, size, waste water constituents and other factors require development of separate limitations and standards for different segments of the point source category. The raw waste characteristics for each such segment were then identified. This included an analysis of (1) the source, flow and volume of water used in the process employed and the sources of waste and waste waters in the operation; and (2) the constituents of the waste which should be subject to effluent limitations guidelines and standards of performance were identified.

The control and treatment technologies existing within each segment were identified. This included an identification of each distinct control and treatment technology, including both in-plant and end-of-process technologies, which are existent or capable of being designed for each segment. It also included an identification of, in terms of the amount of constituents and the chemical, physical, and biological characteristics of pollutants, the effluent level resulting from the application of each of the technologies. The problems, limitations and reliability of each treatment and control technology were also identified. In addition, the nonwater quality environmental impact, such as the effects of the application of such technologies upon other pollution problems, including air, solid waste, noise and radiation, was identified. The energy requirements of each control and treatment technology were determined, as well as the cost of the application of such technologies.

The information, as outlined above, was then evaluated in order to determine what levels of technology constitute the "best practicable control technology currently available," "best available technology economically achievable" and the "best available demonstrated control technology, processes, operating methods, or other alternatives." In identifying such technologies, various factors were considered. These included the total cost of application of technology in relation to the effluent reduction benefits to be achieved from such application, the age of equipment and facilities involved, the process employed, the engineering aspects of the application of various types of control techniques, process changes, nonwater quality environmental impact including energy requirements and other factors.

The data on which the above analysis was performed included EPA permit applications, EPA sampling and inspections, consultant reports, and the industry submissions.

The pretreatment standards proposed herein are intended to be complementary to the pretreatment standard proposed for existing sources under of 40 CFR

Part 128. The basis for such standards is set forth in the FEDERAL REGISTER of July 19, 1973, 38 FR 19236. The provisions of Part 128 are equally applicable to sources which would constitute "new sources," under section 306 if they were to discharge pollutants directly to navigable waters except for § 128.133. That section provides a pretreatment standard for "incompatible pollutants" and requires application of the "best practicable control technology currently available," subject to an adjustment for amounts of pollutants removed by the publicly owned treatment works. Since the pretreatment standards proposed herein apply to new sources, §§ 414.15, 414.25, 414.35 and 414.45 below amend § 128.133 to require application of the standard of performance for new sources rather than the "best practicable" standard applicable to existing sources under sections 301 and 304(b) of the Act.

(2) Summary of conclusions with respect to the nonaqueous processes subcategory (Subpart A), processes with process water contact as steam diluent or absorbent subcategory (Subpart B), aqueous liquid phase reaction systems subcategory (Subpart C), and batch and semicontinuous processes subcategory (Subpart D) of the organic chemicals manufacturing category.

(i) Industry description. The organic chemical industry in the United States is a complex matrix in which interrelated chemicals compete for raw materials and markets via increasingly competitive technologies. The water use and subsequent waste water discharges within the industry are closely related to this mix of products and manufacturing processes.

The structure of the industry can be studied by several approaches. There are some companies which specialize in making products for use by another industry, while other firms specialize in the production of compounds having common chemical functional groups or compounds made by similar unit processes.

The concept of horizontal integration is a strong motivating force in the behavior of many companies which produce several products with a common end use. By maintaining a position in each of these products, a company protects itself against intrusion into these common end use markets. Another major influence has been the need for vertical integration. Firms that until recently were content to produce intermediate or end products, have been under constant pressure either to integrate backwards by acquiring their own sources of raw materials or to integrate forward by gaining control of their customers.

Backward integration within the industry has in turn been affected by the changing availability of economical raw materials. Prior to World War II, the organic chemicals industry relied primarily on feedstocks derived from coal. After World War II, more readily processed feedstocks were introduced in the form of refinery dry gas and olefins. These became available through the growth of catalytic cracking installations for gasoline manufacture in refinery operations.

This kind of feedstock was in turn replaced, starting in the early 1950's, by a low priced liquid petroleum gas (LPG) by-product (ethane and propane) from a rapidly expanding natural gas industry based on the Gulf Coast.

During the decade of the 1960's the rapid growth of the industry was twice that of the source of its feedstock supply, natural gas. This situation has led to the increased use of distillates derived from crude oil (naphtha) as feedstocks. Currently, there is sharp competition within the industry for both of these feedstocks. The competition has been intensified by alternate uses for them outside the organic chemicals industry.

In the past, the natural gas industry has found advantages in selling ethane and propane for chemical usage. However, the drastically increased demand for pollution free sources of fuel has completely changed this picture.

Light liquid distillates derived from crude oil have an alternative use and value in gasoline. This has led to sharp competition between chemical producers and oil refiners for the same barrel of crude oil.

A given set of feedstocks, intermediates, and products associated with the operation of any specific facility represents the sum of these considerations as they relate to an individual company. Each plant's set of process operations and production is a unique contribution to a profitable operation.

The term "production" must be accurately defined when applied to a chemical plant. It is erroneous to base production only on those commodities which are finally shipped across plant boundaries for sale. The true production associated with any given plant must include the captive utilization of feedstocks and intermediate processing steps between the initial feedstock (e.g. LPG, naphtha) and final products.

Each process is itself a series of unit operations which effect chemical and physical changes in the feedstock or products. In the commercial synthesis of a simple product from a single feedstock, there are normally sections of the process associated with the preparation of the feedstock, the chemical reaction, the separation of reaction products, and the final purification of the desired product. Each unit operation may have drastically different water usages associated with it. The type and quantity of waste water produced by a given facility is therefore directly related to the nature of the various processes within its boundaries.

The production from a given process module is related to the design capacities of the individual unit operations within it. In many cases, some unit operations such as the central reaction, are carried out in several small reactors operating in parallel.

The flow of material between unit operations within a process may be either a continuous stream or through a series of batch transfers. Both types of processes normally have an associated design capacity, which can be expressed as millions of pounds of product per year.

The actual rate at which a product is produced may be higher or lower than the rated capacity, depending on such factors as down time (for maintenance, catalyst regeneration, etc.), process "debottlenecking", variations in feedstock availability, and product demand.

To insure the smooth operation of the different segments within a producing facility, manufacturers maintain inventories of the amounts of feedstock, intermediate products, and final products available for subsequent reaction or shipment from the plant. Depending on the nature of the operation, these inventories are updated on a monthly, weekly, or even daily basis. The examination of historical production inventories and associated manufacturing processes for a given facility provides the most meaningful picture of the activities within its boundaries. This is directly related to the type and quantity of wastes which are generated.

(ii) Categorization. The organic chemicals manufacturing category consists of approximately 260 product commodities listed under the Governments Standard Industrial Classifications (SIC) 2865 (formerly SIC 2815), Cyclic Intermediates, Dyes, Organic Pigments and Coal Tar Crudes, and SIC 2869 (formerly SIC 2818), Industrial Organic Chemicals not elsewhere classified. Of these 260 product commodities listed under SIC 2865 and SIC 2869, 210 significant product commodities, which are manufactured by 269 processes, were identified. These product-process segments are estimated to comprise greater than 99 percent of the industry's production capacity. From the list of 269 significant product-process segments, 41 major product-process segments were selected, as they represent approximately 75 percent of the industry's production capacity. These product-process segments are presented in Table I. Effluent limitations, as set forth in these regulations (Part 414), are applicable to the product-process segments shown in Table I.

TABLE I

SUBCATEGORY A NONAQUEOUS PROCESSES

MAJOR PRODUCTS AND PROCESSES

Product	*Process*
Cyclohexane	Hydrogenation of Benzene.
Ethyl Benzene	Alkylation of Benzene with Ethylene.
Vinyl Chloride	Addition of Hydrochloric Acid to Acetylene.
BTX Aromatics	Hydrotreatment of Pyrolysis Gasoline.
BTX Aromatics	Solvent Extraction from Reformate.

SUBCATEGORY B PROCESSES WITH PROCESS WATER CONTACT AS STEAM DILUENT OR ABSORBENT

MAJOR PRODUCTS AND PROCESSES

Product	*Process*
Ethylene and Propylene.	Pyrolysis of Naphtha or Liquid Petroleum Gas.
Butadiene	Co-Product of Ethylene.

Product	*Process*
Butadiene	Oxidative Dehydrogenation of n-Butane.
Butadiene	Dehydrogenation of n-Butane.
Methanol	Steam Reforming of Natural Gas.
Acetone	Dehydrogenation of Isoproganol.
Acetaldehyde	Oxidative Dehydrogenation of Ethanol.
Vinyl Acetate	Synthesis of Ethylene and Acetic Acid.
Acetylene	Partial Oxidation of Methane.
Ethylene Oxide	Catalytic Oxidation of Ethylene.
Formaldehyde	Oxidation of Methanol.
Ethylene Dichloride.	Direct Chlorination of Ethylene.
Vinyl Chloride	Cracking of Ethylene Dichloride.
Styrene	Dehydrogenation of Ethyl Benzene.
Methyl Amines	Addition of Ammonia to Methanol.

SUBCATEGORY C AQUEOUS LIQUID REACTION SYSTEMS MAJOR PRODUCTS AND PROCESSSES

Product	*Process*
Phenol	Chlorobenzene Process.
Phenol and Acetone.	Cumene Oxidation and Cleavage.
Oxo Chemicals	Carbonylation and Condensation.
Acetaldehyde	Oxidation of Ethylene.
Acetic Acid	Oxidation of Acetaldehyde.
Methyl Methacrylate.	Acetone Cyanohydrin Process.
Ethylene Glycol	Hydration of Ethylene Oxide.
Acrylic Acid	Synthesis with Carbon Monoxide and Acetylene.
Acrylates	Esterification of Acrylic Acid.
Terephthalic Acid (TPA).	Nitric Acid Oxidation of p-Xylene Catalytic.
Terephthalic Acid (TPA).	Catalytic Oxidation of p-Xylene.
Polymer Grade TPA.	Purification of Crude Terephthalic Acid.
Dimethyl Terephthalate.	Esterification of Terephthalic Acid.
p-Cresol	Sulfonation of Toluene.
Aniline	Hydrogenation of Nitrobenzene.
Bisphenol A	Condensation of Phenol and Acetone.
Caprolatam	Oxidation of Cyclohexane.
Tetraethyl Lead	Addition of Ethyl Chloride to Lead Amalgam.
Coal Tar Products.	Coal Tar Distillation.
	Pitch Forming.

SUBCATEGORY D BATCH AND SEMICONTINUOUS PROCESSES MAJOR PRODUCTS AND PROCESSES

Organic Dye Products:

Azoic Dyes and Components.

The organic chemicals manufacturing category was subcategorized by the identification of four major process related subcategories in which all 269 product-process segments were classified. Subcategories A, B, and C are comprised of continuously operated processes. Subcategory D is comprised of batch and semicontinuous processes. Each subcategory is defined on the basis of manufacturing process technology and process waste water generated. These subcategories are defined as follows:

(1) *Subpart A—Nonaqueous processes subcategory:* These processes have minimal contact between water and reactants or products within the process.

Water is not required as a reactant or diluent and is not formed as a reaction product. The only water usage stems from periodic washes of working fluids or catalyst hydration.

(2) *Subpart B—Processes with process water contact as steam diluent or absorbent subcategory:* Process water usage is in the form of dilution steam, direct contact quench, or as an absorbent for reactor effluent gases. Reactions are all vapor-phase and carried out over solid catalysts. Most processes have an absorber coupled with steam stripping of chemicals for purification and recycle.

(3) *Subpart C—Aqueous liquid-phase reaction systems subcategory:* These are liquid-phase reactions where the catalyst is generally in aqueous media such as dissolved or emulsified mineral salt, or acid and caustic solutions. Continuous regeneration of catalyst system requires extensive water usage. Substantial removal of spent inorganic salt by-products may also be required. Working aqueous catalyst solution is normally corrosive. Additional process water is required in final purification or neutralization of products.

(4) *Subpart D—Batch and semicontinuous processes subcategory:* Processes are carried out in reaction kettles equipped with agitators, scrapers, reflux condensers, etc. depending on the nature of the operation. Many reactions are liquid-phase with aqueous catalyst systems. Reactants are transferred to batch reactors by gravity flow, pumping, or pressurization with air or inert gas. Much of the material handling is manual, and there is limited use of automatic process control. Filter presses and centrifuges are commonly used to separate solid products from liquid. Where drying is required, air or vacuum ovens are used. Cleaning of noncontinuous production equipment constitutes a major source of process waste water.

Due to the large range of raw waste loads for product-process segments in subcategories B and C, it was necessary to establish effluent limitations within each of these subcategories. This was accomplished by determining the median raw waste loads of product-process segments in each subcategory. Product-process segments with raw waste loads below the median value were subsequently designated B1 and C1 respectively. Those product-process segments with raw waste loads above the median value were designated B2 and C2 respectively.

(iii) Constituents of waste water pollutants. In determining the major pollutants and effectiveness of various treatment alternatives, the following pollutant parameters were measured: biochemical oxygen demand (BOD5), chemical oxygen demand (COD), total organic carbon (TOC), total suspended solids (TSS), phenols, pH, cyanide (CN), ammonia (NH3), total kjeldahl nitrogen (TKN), extractable oils, sulfate, total phosphorus (TP), zinc (Zn), copper (Cu), iron (Fe), chromium (Cr), and cadmium (Cd).

It was determined that dissolved organic chemicals constitute the major pollutant source in this industry. The following pollutant parameters were selected on this basis: Biochemical oxygen demand (BOD5), chemical oxygen demand (COD), total suspended solids (TSS), and phenols. Other pollutant parameters were found to be less significant in the raw waste loads or treated effluent.

Effluent limitations have not been established for cyanide (CN) and cadmium (Cd) although trace quantities of these pollutants were found in certain process waste streams. Significant reductions of these pollutants are expected to occur after end-of-process treatment by best practicable control technology currently available.

(iv) Cost and energy requirements. Capital and annual end-of-process treatment costs have been estimated for each level of technology and are presented in the Development Document. These costs were also estimated by treatment plant size with treated effluent flows: 0.072, 0.36, 0.72, and 2.16 million gallons per day. Annual costs were also calculated per 1000 gal treated effluent and per pound of BOD5 removed.

Total industry cost for best practicable control technology currently available is estimated at $1,030 million ("Economic Impact of Water Pollution Control on the Organic Chemicals Industry," Arthur D. Little, Inc., Cambridge, Mass., 1973). This cost includes a substantial portion of capital (approximately 25 percent) which has been invested as of 1973.

Annual energy requirements for best practicable control technology currently available (BPCTCA) treatment and control are estimated to be 2 trillion BTU (600 million Kwh) for the entire industry. This is relatively insignificant (less than 1 percent) when compared to the total energy requirements for this industry.

(v) Nonwater quality environmental impact. The major nonwater quality consideration which may be associated with in-process control measures is the use of alternate means of ultimate disposal. As process raw waste loads are reduced in volume using water conservation and reuse, industry may wish to decide on alternate disposal technologies such as incineration, ocean discharge, deep well injection, and land disposal. Each of these alterantives must be evaluated on a case by case basis within EPA's policy and statutory requirements for air quality, ocean, deep well, and land disposal.

No increased air pollution problems should develop as a result of water treatment processes.

Solid wastes will increase as a result of the removal of suspended solids from process waste water. Best practicable control technology and best available control technology as they are known today, require disposal of the pollutants removed from waste waters in this industry in the form of solid wastes and

liquid concentrates. In most cases these are nonhazardous substances requiring only minimal custodial care. However, some constituents may be hazardous and may require special consideration. In order to ensure long term protection of the environment from these hazardous or harmful constituents, special consideration of disposal sites must be made. All landfill sites where such hazardous wastes are disposed should be selected so as to prevent horizontal and vertical migration of these contaminants to ground or surface waters. In cases where geologic conditions may not reasonably ensure this, adequate legal and mechanical precautions (e.g. impervious liners) should be taken to ensure long term protection to the environment from hazardous materials. Where appropriate the location of solid hazardous materials disposal sites should be permanently recorded in the appropriate office of legal jurisdiction.

Thermal pollution is not considered significant for this industry. However, specific situations may require compliance with thermal discharge regulations as water quality considerations dictate.

(vi) Control and treatment technologies. The best practicable control technology currently available (BPCTCA) has been uniformly defined for all four major subcategories in the organic chemicals manufacturing industry as biological waste treatment. In determining this technology, it was first necessary to determine the performance of exemplary biological waste treatment systems. These systems consist of various combinations of biological processes: activated sludge, activated sludge preceded by trickling filters, aerated lagoons, anaerobic and aerobic lagoons, and activated sludge followed by aerated lagoons. The following model system was used for cost estimating purposes and does not limit the BPCTCA solely to these processes: equalization with pH control and oil separation, activated sludge with chemical addition of coagulants to aid in clarification of suspended solids. Effluent limitations based upon the application of BPCTCA biological treatment systems do not preclude the use of equivalent chemical-physical or other treatment systems wherever applicable.

Determining the best available demonstrated control technology (BADCT) for new organic chemical manufacturing sources involved the evaluation of the best in-process control measures and end-of-process technologies. Some in-process controls which would involve the most exemplary practice are as follows:

(*a*) The substitution of nonprocess contact heat exchangers (using air, water or refrigerants) for direct contact water cooling (barometric condensers);

(*b*) The use of nonaqueous quench media (e.g. hydrocarbons such as furnace oil) as a substitute for water, where direct contact quench is required;

(*c*) The recycle of process water, such as between absorber and stripper;

(*d*) The reuse of process water (after treatment) as make-up to evaporative cooling towers through which noncontact cooling water is circulated;

(*e*) The use of process water to produce low pressure steam by noncontact heat exchangers in reflex condensers or distillation columns;

(*f*) The recovery of spent acid or caustic solutions for reuse;

(*g*) The recovery and reuse of spent catalyst solutions;

(*h*) The use of nonaqueous solvents for extraction of products.

End-of-process waste treatment systems consist of biological waste treatment with additional suspended solids removal by such processes as flotation, sedimentation, flocculation, coagulation, sand filtration and dual media filtration.

Although biological treatment has been described as the basis for the BADCT, it is recognized that chemical-physical systems such as activated carbon may also be employed as an end-of-process technology or as an in-process recovery system. It may also be necessary to remove certain wastes which are harmful to or interfere with biological waste treatment systems by in-process chemical physical control processes.

In determining the best available technology economically achievable for all sources by 1983, it was necessary to evaluate the best control and treatment technologies. This analysis was focused on the reduction of the major pollutant, dissolved organic chemicals as measured by the chemical oxygen demand (COD) analysis. Applicable in-process controls as previously described for the BADCT maximize the reductions of raw wastes, particularly from harmful and biorefractory sources. The model end-of-process system for all four subcategories involves addition of activated carbon to the biological waste treatment model for BADCT. As previously emphasized, this model does not preclude the use of equivalent systems. It has been recognized that in-process controls are frequently used to recover products or by-products and remove substances which interfere with biological treatment systems. These in-process systems may preclude the need for additional end-of-process activated carbon treatment.

(vii) Effluent limitations are based upon the median raw waste load data for each subcategory and the degree of reduction attainable by each treatment and control technology. The following pollutant parameters were limited by application of BPCTCA: biochemical oxygen demand, 5 day, total suspended solids (TSS), and phenols. The same pollutant parameters are limited for the new sources (BADCT) and best available technology economically achievable (BATEA) with the addition of a limitation for chemical oxygen demand (COD).

The report entitled "Development Document for Proposed Effluent Limitations Guidelines and New Source Performance Standards for the Major Organic Products Segment of the Organic Chemicals Manufacturing Point Source Category," which details the analysis undertaken in support of the regulations being proposed herein, is available for inspection in the EPA Information Center, Room 227, West Tower, Waterside Mall, Washington, D.C., at all EPA regional offices, and at State water pollution control offices. A supplementary analysis prepared for EPA of the possible economic effects of the proposed regulations is also available for inspection at these locations. Copies of both of these documents are being sent to persons or institutions affected by the proposed regulations, or who have placed themselves on a mailing list for this purpose (see EPA's advance notice of public review procedures, 38 FR 21202, Aug. 6, 1973.) An additional limited number of copies of both reports are available. Persons wishing to obtain a copy may write EPA Information Center, Environmental Protection Agency, Washington, D.C. 20460, Attention: Mr. Philip B. Wisman.

(c) *Summary of public participation.*

Prior to the publication, the agencies and groups listed below were consulted and given an opportunity to participate in the development of the effluent limitations guidelines and standards of performance for the organic chemicals manufacturing industry. All participating agencies have been informed of project developments. An initial draft of the Development Document was sent to all participants and comments were solicited on that report. The following are the principal agencies and groups consulted: (1) Effluent Standards and Water Quality Information Advisory Committee (established under section 515 of the Act); (2) All States and U.S. Territorial Pollution Control Agencies; (3) New England Interstate Water Pollution Control Commission; (4) Ohio River Valley Sanitation Commission; (5) Delaware River Basin Commission; (6) The American Society of Civil Engineers; (7) The American Society of Mechanical Engineers; (8) Hudson River Sloop Restoration, Inc.; (9) The Conservation Foundation; (10) Environmental Defense Fund, Inc.; (11) National Resources Defense Fund, Inc.; (12) National Resources Defense Council; (13) Water Pollution Control Federation; (14) The National Wildlife Federation; (15) The New York Scientists Committee for Public Information; (16) Department of the Interior; (17) Department of Commerce; (18) Water Resources Council; (19) Department of the Treasury; (20) Department of Defense; (21 Atomic Energy Commission; (22) Department of Health, Education, and Welfare; (23) Manufacturing Chemists Association; and (24) Synthetic Organic Chemical Manufacturers Association.

The following organizations responded with comments: Effluent Standards and Water Quality Information Advisory Committee; State of Arizona; State of California; State of Colorado; State of Georgia; State of Hawaii; State of Illinois; State of Kentucky; State of Maine; State of Michigan; State of Missouri; State of New York; State of North Carolina; State of Ohio; State of Washington; Delaware River Basin Commission; American Society of Civil Engineers; Environmental Defense Fund, Inc.; National Resources Defense Council; United States Water Resources Council; Atomic

Energy Commission; Department of Commerce; Department of Defense; Department of Health, Education, and Welfare; Department of the Interior; Monsanto Company; Union Carbide Corporation; and the Manufacturing Chemists Association.

The primary issues raised from those who responded in the development of these proposed effluent limitations guidelines and standards of performance and the treatment of these issues herein are as follows. Public comments on all these suggestions are solicited.

(1) Most commenters expressed general agreement that the process oriented categorization system is reasonable, explains raw waste load variations to a reasonable extent, and is useful in simplifying what is universally understood to be a complex industry. Some commenters questioned the lack of consideration for factors such as age, size of plants, location, waste load variations within categories, and waste load treatability.

The analysis used in categorizing the industry shows that the subcategories adequately characterize the industry as to process technology and raw waste load variations. Hence, this approach will be followed. Additionally, the subcategories also explain to a large extent factors such as age, location, size, treatability, and raw waste load variations. Age of plant is generally not considered to be a relevant factor for most chemical plants since the industry is constantly in the state of technological change. Subcategory A and B product-processes are common to large petrochemical plants located in the South and Gulf Coast areas. These plants are characteristically large volume operations employing the latest control technology. Subcategory C product-processes comprise a large mixture of processes (aqueous phase reactions) and raw waste loads. The higher waste load product-processes (C2) are sometimes characteristic of older and less competitive processes; for example, the nitric acid TPA process. Subcategory D product-processes comprise a large variety of specialty organic chemicals maufactured by batch and semicontinuous processes as compared to the continuously separated A, B, and C Subcategories, Effluent limitations are specified for organic dyes and organic pigments in Subcategory D. Subcategory D plants are relatively small in size, tend to employ less efficient process technologies and are generally located in large metropolitan areas in the Northeast. These plants are also most likely to discharge their effluent to municipal waste treatment plants.

(2) Most commenters questioned the contractor's approach in determining effluent limitations for industry segments within subcategories which are based solely on process waste water flow.

This approach did not adequately consider raw waste loads as a factor in determining effluent limitations. Inequities would also occur for plants that practice water conservation and reuse since similar plants that utilize excessive quantities of water would receive higher effluent load allocations. In developing the effluent limitations that are presented in this document (Part 414) median raw waste loads were determined for each subcategory. Due to the large raw waste load variations within Subcategories B and C, product-process segments within each subcategory were further subcategorized into two groups and the median raw waste load value for each calculated. Finally, effluent limitations were determined from reductions of raw waste loads achievable by the application BPCTCA end-of-process waste treatment systems.

(3) Some commenters expressed the view that the organic chemicals manufacturing industry is too complex for effluent limitations and standards and that the intent of the law would be fulfilled by publishing only guidelines.

Section 301 requires the achievement by July 1, 1977 of "effluent limitations" for point sources. Data obtained for major segments of this industry has indicated that a "range" of achievable limitations is not necessary. In developing effluent limitations and standards, the organic chemicals industry was first categorized. These factors were also evaluated: age, size of plant, location, process, raw waste, treatability, the full range of control and treatment technologies and treatment process variability. Industry categorization and subsequent effluent limitations contained in Part 414 do not require further consideration and variance as a result of these factors. Daily maximum and monthly maximum limitations were based upon normal treatment variations resulting from temperature, wasteload, operations, testing and other factors which were observed from properly designed and operated waste treatment facilities.

(4) Many commenters disagreed with the contractor's recommendation of BOD5, TOC and COD limitations for the best practicable control technology currently available.

The biochemical oxygen demand parameter (BOD5) was determined to be the more appropriate oxygen demand pollutant parameter for biological waste treatment systems as recommended for BPCTCA. Other pollutant parameters such as chemical oxygen demand (COD) and total organic carbon (TOC) measure the non-biodegradable as well as the biodegradable pollutants in waste streams. It is not possible, at this time, to establish a direct relationship between BOD5, COD, and TOC that would be appropriate for the various mixtures of pollutants in the treated effluent from biological treatment systems. However, such a correlation may often be determined for a particular waste stream. For such cases, either the COD or TOC pollutant parameters could be specified in lieu of or in addition to the BOD5 parameter.

(5) Some commenters expressed disagreement with the use of activated carbon treatment technology for new sources (BADCT) as well as BATEA.

The best available demonstrated control technology (BADCT) for new sources has been defined as biological treatment with additional suspended solids removal. Best available technology economically achievable (BATEA) which is applicable by July 1, 1983, is defined as biological with activated carbon end-of-process treatment. Although activated carbon waste treatment systems are presently utilized in certain applications, this technology is not universally applicable to all organic chemical waste effluents at this time. It is expected that activated carbon waste treatment systems will be fully developed and available industry-wide by the effective date for the best available technology economically achievable.

(6) Many commenters disagreed with the contractor's cost data.

These costs were reviewed and modifications made where appropriate.

Interested persons may participate in this rulemaking by submitting written comments in triplicate to the EPA Information Center, Environmental Protection Agency, Washington, D.C. 20460, Attention: Mr. Philip B. Wisman. Comments on all aspects of the proposed regulations are solicited. In the event comments are in the nature of criticisms as to the adequacy of data which is available, or which may be relied upon by the Agency, comments should identify and, if possible, provide any additional data which may be available and should indicate why such data is essential to the development of the regulations. In the event comments address the approach taken by the Agency in establishing an effluent limitation guideline or standard of performance, EPA solicits suggestions as to what alternative approach should be taken and why and how this alternative better satisfies the detailed requirements of sections 301, 304(b), 306 and 307 of the Act.

A copy of all public comments will be available for inspection and copying at the EPA Information Center, Room 227, West Tower, Waterside Mall, 401 M Street SW., Washington, D.C. A copy of preliminary draft contractor reports, the Development Document and economic study referred to above and certain supplementary materials supporting the study of the industry concerned will also be maintained at this location for public review and copying. The EPA information regulation, 40 CFR Part 2, provides that a reasonable fee may be charged for copying.

All comments received on or before January 16, 1974, will be considered. Steps previously taken by the Environmental Protection Agency to facilitate public response within this time period are outlined in the advance notice concerning public review procedures published on August 6, 1973 (38 FR 21202).

Dated: December 4, 1973.

JOHN QUARLES,
Acting Administrator.

PART 414—EFFLUENT LIMITATIONS GUIDELINES FOR EXISTING SOURCES AND STANDARDS OF PERFORMANCE AND PRETREATMENT STANDARDS FOR NEW SOURCES FOR THE ORGANIC CHEMICALS MANUFACTURING INDUSTRY POINT SOURCE CATEGORY

Subpart A—Nonaqueous Processes Subcategory

Sec.

414.10 Applicability: Description of nonaqueous processes subcategory.
414.11 Special definitions.
414.12 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best practicable control technology currently available.
414.13 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best available technology economically achievable.
414.14 Standards of performance for new sources.
414.15 Pretreatment standards for new sources.

Subpart B—Processes With Process Water Contact as Steam Diluent or Absorbent Subcategory

414.20 Applicability: Definition of processes with process water contact as steam diluent or absorbent subcategory.
414.21 Special definitions.
414.22 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best practicable control technology currently available.
414.23 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best available technology economically achievable.
414.24 Standards of performance for new sources.
414.25 Pretreatment standards for new sources.

Subpart C—Aqueous Liquid Phase Reaction Systems Subcategory

414.30 Applicability: Definition of aqueous liquid phase reaction systems subcategory.
414.31 Special definitions.
414.32 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best practicable control technology currently available.
414.33 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best available technology economically achievable.
414.34 Standards of performance for new sources.
414.35 Pretreatment standards for new sources.

Subpart D—Batch and Semicontinuous Process Subcategory

414.40 Applicability: Description of batch and semi-continuous processes subcategory.
414.41 Special definitions.
414.42 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best practicable control technology currently available.
414.43 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best available technology economically achievable.
414.44 Standards of performance for new sources.
414.45 Pretreatment standards for new sources.

Subpart A—Nonaqueous Processes Subcategory

§ 414.10 Applicability: Description of the nonaqueous processes subcategory.

The provisions of this subpart are applicable to process waste water discharges resulting from the manufacture of the following products:

Products	*Process descriptions*
Cyclohexane	Hydrogenation of benzene.
Ethyl benzene	Alkylation of benzene with ethylene.
Vinyl Chloride	Addition of hydrochloric acid to acetylene.
BTX Aromatics	Hydrotreatment of pyrolysis gasoline.
BTX Aromatics	Solvent extraction from reformate.

§ 414.11 Special definitions for purposes of this subpart.

(a) The term "phenols" shall mean those components of a waste water amenable to measurement by the method described in 1972 Annual Book of ASTM Standards, Part 23, 1972, Standard D1783–70, pg. 445.

(b) The following abbreviations shall mean: (i) "BOD5" shall mean five day biochemical oxygen demand; (ii) "COD" shall mean chemical oxygen demand; (iii) "TSS" shall mean total suspended non-filterable solids; (iv) "kg" shall mean kiogram(s); (v) "kkg" shall mean 1000 kilograms; and (vi) "lb" shall mean pound(s).

§ 414.12 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of the best practicable control technology currently available.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged after application of the best practicable control technology currently available by a point source subject to the provisions of this subpart:

Effluent characteristics	*Effluent limitation*
BOD5	Maximum for any one day 0.045 kg/kkg of product (0.045 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.025 kg/kkg of product (0.025 lb/1000 lb).
TSS	Maximum for any one day 0.038 kg/kkg of product (0.038 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.023 kg/kkg of product (0.023 lb/1000 lb).
Phenols	Maximum for any one day 0.0005 kg/kkg of product (0.0005 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.00025 kg/kkg of product (0.00025 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

§ 414.13 Effluent limitations guidelines representing the degree of reduction attainable by the application of best available technology economically achievable.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged after application of the best available technology economically achievable by a point source subject to the provisions of this subpart:

Effluent characteristics	*Effluent limitation*
COD	Maximum for any one day 0.04 kg/kkg of product (0.04 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.02 kg/kkg of product (0.02 lb/1000 lb).
BOD5	Maximum for any one day 0.004 kg/kkg of product (0.004 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.002 kg/kkg of product (0.002 lb/1000 lb).
TSS	Maximum for any one day 0.006 kg/kkg of product (0.006 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.004 kg/kkg of product (0.004 lb/1000 lb).
Phenols	Maximum for any one day 0.00005 kg/kkg of product (0.00005 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.000025 kg/kkg of product (0.000025 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

§ 414.14 Standards of performance for new sources.

The following limitations constitute the quantity of quality of pollutants or pollutant properties which may be discharged reflecting the greatest degree of effluent reduction achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants by a new point source subject to the provisions of this subpart:

Effluent characteristics	*Effluent limitation*
BOD5	Maximum for any one day 0.02 kg/kkg of product (0.02 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.012 kg/kkg of product (0.012 lb/1000 lb).
COD	Maximum for any one day 0.15 kg/kkg of product (0.15 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.10 kg/kkg of product (0.10 lb/1000 lb).

Effluent characteristics	*Effluent limitation*
TSS	Maximum for any one day 0.012 kg/kkg of product (0.012 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.0075 kg/kkg of product (0.0075 lb/1000 lb).
Phenols	Maximum for any one day 0.00010 kg/kkg of product (0.00010 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.00005 kg/kkg of product (0.00005 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

§ 414.15 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act, for a source within the nonaqueous processes subcategory, which is an industrial user of a publicly owned treatment works (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to navigable waters), shall be the standards set forth in 40 CFR, Part 128, except that for the purposes of this section, 40 CFR 128.133, shall read as follows: "In addition to the prohibitions set forth in § 128.133, the pretreatment standard for incompatible pollutants introduced into a publicly owned treatment works by a major contributing industry shall be the standard of performance for new sources specified in 40 CFR 414.14: *Provided,* That, if the publicly owned treatment works which receives the pollutants is committed, in its NPDES permit, to remove a specified percentage of any incompatible pollutant, the pretreatment standard applicable to users of such treatment works shall be correspondingly reduced for that pollutant."

Subpart B—Processes With Process Water Contact as Steam Diluent or Absorbent Subcategory

§ 414.20 Applicability: Description of the processes with process contact as steam diluent or absorbent subcategory.

The provisions of this subpart are applicable to the process waste water discharges resulting from the manufacture of the following products:

B1 products	*B1 process descriptions*
Ethylene and propylene	Pyrolysis of naphtha or liquid petroleum gas.
Butadiene	Co-product of ethylene.
Methanol	Steam reforming of natural gas.
Acetone	Dehydrogenation of isopropanol.
Acetaldehyde	Dehydrogenation of ethanol.
Vinyl acetate	Synthesis of ethylene and acetic acid.

B2 products	*B2 process descriptions*
Butadiene	Dehydrogenation of n-butane.
Butadiene	Oxidative dehydrogenation of n-butane.
Acetylene	Partial oxidation of methane.
Ethylene oxide	Catalytic oxidation of ethylene.
Formaldehyde	Oxidation of methanol.
Ethylene dichloride	Direct chlorination of ethylene.
Vinyl chloride	Cracking of ethylene dichloride.
Styrene	Dehydrogenation of ethyl benzene.
Methyl amines	Addition of ammonia to methane.

§ 414.21 Special definitions.

For purposes of this subpart:

(a) The term "phenols" shall mean those components of a waste water amenable to measurement by the method described in 1972 Annual Book of ASTM Standards, Part 23, 1972, Standard D 173–70, pg. 445.

(b) The following abbreviations shall mean: (i) "BOD5" shall mean five day biochemical oxygen demand; (ii) "COD" shall mean chemical oxygen demand; (iii) "TSS" shall mean total suspended non-filterable solids; (iv) "kg" shall mean kilogram(s); (v) "kkg" shall mean 1000 kilograms; and (vi) "lb" shall mean pound(s).

§ 414.22 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best practicable control technology currently available.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged after application of the best practicable control technology currently available by a point source subject to provisions of this subpart:

(a) The following limitations constitute the maximum permissible discharge for ethylene, propylene, butadiene (co-product of ethylene), methanol, acetone, acetaldehyde (dehydrogenation of ethanol), and vinyl acetate manufacturing on the basis of production:

Effluent characteristics	*Effluent limitation*
BOD5	Maximum for any one day 0.10 kg/kkg of product (0.10 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.06 kg/kkg of product (0.06 lb/1000 lb).
TSS	Maximum for any one day 0.10 kg/kkg of product (0.10 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.06 kg/kkg of product (0.06 lb/1000 lb).
Phenols	Maximum for any one day 0.0013 kg/kkg of product (0.0013 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.00066 kg/kkg of product (0.00066 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

(b) The following limitations constitute the maximum permissible discharge for butadiene (dehydrogenation or oxidative dehydrogenation of n-butane), acetylene, ethylene oxide, formaldehyde, ethylene dichloride, vinyl chloride, styrene and methyl amines manufacturing on the basis of production:

Effluent characteristics	*Effluent limitation*
BOD5	Maximum for any one day 0.30 kg/kkg of product (0.30 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.17 kg/kkg of product (0.17 lb/1000 lb).
TSS	Maximum for any one day 0.27 kg/kkg of product (0.27 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.16 kg/kkg of product (0.16 lb/1000 lb).
Phenols	Maximum for any one day 0.0034 kg/kkg of product (0.0034 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.0017 kg/kkg of product (0.0017 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

§ 414.23 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best available technology economically achievable.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged after application of the best available technology economically achievable by a point source subject to the provisions fo this subpart:

(a) The following limitations constitute the maximum permissible discharge for ethylene, propylene, butadiene (co-product of ethylene), methanol, acetone, acetaldehyde (dehydrogenation of ethanol), and vinyl acetate manufacturing on the basis of production:

Effluent Characteristics	*Effluent limitation*
COD	Maximum for any one day 0.13 kg/kkg of product (0.13 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.065 kg/kkg of product (0.065 lb/1000 lb).
BOD5	Maximum for any one day 0.008 kg/kkg of product (0.008 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.004 kg/kkg of product (0.004 lb/1000 lb).
TSS	Maximum for any one day 0.017 kg/kkg of product (0.017 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.010 kg/kkg of product (0.010 lb/1000 lb).
Phenols	Maximum for any one day 0.00013 kg/kkg of product (0.00013 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.000065 kg/kkg of product (0.000065 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

(b) The following limitations constitute the maximum permissible discharge for butadiene (dehydrogenation or oxidative dehydrogenation of n-butane), acetylene, ethylene oxide, formaldehyde, ethylene dichloride, vinyl chloride, styrene, and methyl amines manufacturing on the basis of production:

Effluent characteristics	*Effluent limitation*
COD	Maximum for any one day 0.74 kg/kkg of product (0.74 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.37 kg/kkg of product (0.37 lb/1000 lb).
BOD5	Maximum for any one day 0.02 kg/kkg of product (0.02 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.01 kg/kkg of product (0.01 lb/1000 lb).
TSS	Maximum for any one day 0.0042 kg/kkg of product (0.0042 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.0025 kg/kkg of product (0.0025 lb/1000 lb).
Phenols	Maximum for any one day 0.00034 kg/kkg of product (0.00034 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.00017 kg/kkg of product (0.00017 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

§ 414.24 Standards of performance for new sources.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged reflecting the greatest degree of effluent reduction achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants by a new point source subject to the provisions of this subpart:

(a) The following limitations constitute the maximum permissible discharge for ethylene, propylene, butadiene (coproduct of ethylene), methanol, acetone, acetaldehyde (dehydrogenation of ethanol), and vinyl acetate manufacturing on the basis of production:

Effluent characteristics	*Effluent limitation*
BOD5	Maximum for any one day 0.06 kg/kkg of product (0.06 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.035 kg/kkg of product (0.035 lb/1000 lb).
COD	Maximum for any one day 0.55 kg/kkg of product (0.55 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.40 kg/kkg of product (0.40 lb/1000 lb).
TSS	Maximum for any one day 0.033 kg/kkg of product (0.033 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.02 kg/kkg of product (0.02 lb/1000 lb).
Phenols	Maximum for any one day 0.00026 kg/kkg of product (0.00026 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.00013 kg/kkg of product (0.00013 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

(b) The following limitations constitute the maximum permissible discharge for butadiene (dehydrogenation of n-butane), acetylene, ethylene oxide, formaldehyde, ethylene dichloride, vinyl chloride, styrene, and methyl amines manufacturing on the basis of production.

Effluent characteristics	*Effluent limitation*
BOD5	Maximum for any one day 0.15 kg/kkg of product (0.15 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.085 kg/kkg of product (0.085 lb/1000 lb).
COD	Maximum for any one day 3.0 kg/kkg of product (3.0 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 2.2 kg/kkg of product (2.2 lb/1000 lb).
TSS	Maximum for any one day 0.083 kg/kkg of product (0.083 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.05 kg/kkg of product (0.05 lb/1000 lb).
Phenols	Maximum for any one day 0.00068 kg/kkg of product (0.00068 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.00034 kg/kkg of product (0.00034 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

§ 414.25 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act, for a source within the processes with process water contact as steam diluent or absorbent subcategory, which is an industrial user of a publicly owned treatment works (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to navigable waters), shall be the standards set forth in 40 CFR Part 128, except that for the purposes of this section, 40 CFR 128.133, shall read as follows: "In addition to the prohibitions set forth in § 128.133, the pretreatment standard for incompatible pollutants introduced into a publicly owned treatment works by a major contributing industry shall be the standard of performance for new sources specified in 40 CFR 414.24: *Provided*, That, if the publicly owned treatment works which receives the pollutants is committed, in its NPDES permit, to remove a specified percentage of any incompatible pollutant, the pretreatment standard applicable to users of such treatment works shall be correspondingly reduced for that pollutant."

Subpart C—Aqueous Liquid Phase Reaction Systems Subcategory

§ 414.30 Applicability: Description of the aqueous liquid phase reaction systems subcategory.

The provisions of this subpart are applicable to the process waste water discharges resulting from the manufacturing of the following products:

C1 products	*C1 process descriptions*
Acetaldehyde	Oxidation of ethylene with air.
Acetaldehyde	Oxidation of ethylene with oxygen.
Acetic acid	Oxidation of acetaldehyde.
Acrylic acid	Synthesis with carbon monoxide and acetylene.
Aniline	Nitration and hydrogenation of benzene.
Bisphenol A	Condensation of phenol and acetone.
Coal tar	Pitch forming.
Coal tar	Distillation.
Dimethyl terephthalate.	Esterification of terephthalic acid.
Ethylene glycol	Hydrogenation of ethylene oxide.
Oxo chemicals	Carbonylation and condensation.
Terephthalic acid	Catalytic oxidation of p-xylene.
Terephthalic acid (polymer grade).	Purification of crude terephthalic acid.
C2 products	*C2 process descriptions*
Acrylates	Esterification of acrylic acids.
p-Cresol	Sulfonation of toluene.
Methyl methacrylate.	Acetone cyanohydrin process.
Terephthalic acid	Nitric acid process.
Tetraethyl lead	Addition of ethyl chloride to lead amalgam.

§ 414.31 Special definitions.

For purposes of this subpart:

(a) The term "phenols" shall mean those components of a waste water amenable to measurement by the method described in "1972 Annual Book of ASTM Standards", Part 23, 1972, Standard D1783–70, page 445.

(b) The following abbreviations shall mean: (i) "BOD5" shall mean five day biochemical oxygen demand; (ii) "COD" shall mean chemical oxygen demand; (iii) "TSS" shall mean total suspended non-filterable solids; (iv) "kg" shall mean kilogram(s); (v) "kkg" shall mean 1000 kilograms; and (vi) "lb" shall mean pound(s).

§ 414.32 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best practicable control technology currently available.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged after application of the best practicable control technology currently available by a point source subject to the provisions of this subpart:

(a) The following limitations constitute the maximum permissible discharge for acetaldehyde (oxidation of ethylene with air or oxygen), acetic acid, acrylic acid, aniline, bisphenol A, coal tar, dimethyl terephthalate, ethylene glycol, oxo chemicals, terephthalic acid (oxidation of p-xylene), and polymer grade terephthalic acid manufacturing on the basis of production:

Effluent characteristics	*Effluent limitation*
BOD5	Maximum for any one day 0.30 kg/kkg of product (0.30 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.17 kg/kkg of product (0.17 lb/1000 lb).
TSS	Maximum for any one day 0.27 kg/kkg of product (0.27 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.16 kg/kkg of product (0.16 lb/1000 lb).
Phenols	Maximum for any one day 0.0034 kg/kkg of product (0.0034 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.0017 kg/kkg of product (0.0017 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

(b) The following limitations constitute the maximum permissible discharge for acrylates, p-cresol, methyl methacrylate, terephthalic acid (nitric acid process) and tetraethyl lead manufacturing on the basis of production:

Effluent characteristics	*Effluent limitation*
BOB5	Maximum for any one day 1.5 kg/kkg of product (1.5 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.9 kg/kkg of product (0.9 lb/1000 lb).
TSS	Maximum for any one day 0.80 kg/kkg of product (0.80 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.49 kg/kkg of product (0.49 lb/1000 lb).
Phenols	Maximum for any one day 0.011 kg/kkg of product (0.011 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.005 kg/kkg of product (0.005 lb/1000 lb).
pH	Within the raneg of 6.0 to 9.0.

§ 414.33 Effluent limitations guidelines representing the degree of reduction attainable by the application of best available technology economically achievable.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged after application of the best available technology economically achievable by a point source subject to the provisions of this subpart:

(a) The following limitations constitute the maximum permissible discharge for acetaldehyde (oxidation of ethylene with air or oxygen), acetic acid, acrylic acid, aniline, bisphenol A, coal tar, dimethyl terephthalate, ethylene glycol, oxo chemicals, terephthalic acid (oxidation of p-xylene), and polymer grade terephthalic acid manufacturing on the basis of production:

Effluent characteristics	*Effluent limitation*
COD	Maximum for any one day 0.78 kg/kkg of product (0.78 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.39 kg/kkg of product (0.39 lb/1000 lb).
BOD5	Maximum for any one day 0.02 kg/kkg of product (0.02 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.01 kg/kkg of product (0.01 lb/1000 lb).
TSS	Maximum for any one day 0.0083 kg/kkg of product (0.0083 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.005 kg/kkg of product (0.005 lb/1000 lb).
Phenols	Maximum for any one day 0.00068 kg/kkg of product (0.00068 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.00034 kg/kkg of product (0.00034 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

(b) The following limitations constitute the maximum permissible discharge for acrylates, p-cresol, methyl methacrylate, terephthalic acid (nitric acid process) and tetraethyl lead manufacturing on the basis of production:

Effluent characteristics	*Effluent limitation*
COD	Maximum for any one day 14.4 kg/kkg of product (14.4 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 7.2 kg/kkg of product (7.2 lb/1000 lb).
BOD5	Maximum for any one day 0.4 kg/kkg of product (0.4 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.2 kg/kkg of product (0.2 lb/1000 lb).
TSS	Maximum for any one day 0.27 kg/kkg of product (0.27 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.16 kg/kkg of product (0.16 lb/1000 lb).
Phenols	Maximum for any one day 0.0022 kg/kkg of product (0.0022 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.0011 kg/kkg of product (0.0011 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

§ 414.34 Standards of performance for new sources.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged reflecting the greatest degree of effluent reduction achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants by a new point source subject to the provisions of this subpart:

(a) The following limitations constitute the maximum permissible discharge for acetaldehyde (oxidation of ethylene with air or oxygen), acetic acid, acrylic acid, aniline, bisphenol A, coal tar, dimethyl terephthalate, ethylene glycol, oxo chemicals, terephthalic acid (oxidation of p-xylene), and polymer grade terephthalic acid manufacturing on the basis of production:

Effluent characteristics	*Effluent limitation*
BOD5	Maximum for any one day 0.15 kg/kkg of product (0.15 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.085 kg/kkg of product (0.085 lb/1000 lb).
COD	Maximum for any one day 3.3 kg/kkg of product (3.3 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 2.3 kg/kkg of product (2.3 lb/1000 lb).
TSS	Maximum for any one day 0.083 kg/kkg of product (0.083 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.05 kg/kkg of product (0.05 lb/1000 lb).
Phenols	Maximum for any one day 0.00068 kg/kkg of product 0.00068 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.00034 kg/kkg of product (0.00034 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

(b) The following limitations constitute the maximum permissible discharge for acrylates, p-cresol, methyl methacrylate, terephthalic acid (nitric acid

process) and tetraethyl lead manufacturing on the basis of production:

Effluent characteristics	*Effluent limitation*
BOD5	Maximum for any one day 0.75 kg/kkg of product (0.75 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.40 kg/kkg of product (0.40 lb/1000 lb).
COD	Maximum for any one day 60 kg/kkg of product (60 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 40 kg/kkg of product (40 lb/1000 lb).
TSS	Maximum for any one day 0.27 kg/kkg of product (0.27 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.16 kg/kkg of product (0.16 lb/1000 lb).
Phenols	Maximum for any one day 0.0022 kg/kkg of product (0.0022 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.0011 kg/kkg of product (0.0011 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

§ 414.35 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act, for a source within the aqueous liquid phase reaction systems subcategory, which is an industrial user of a publicly owned treatment works, (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to navigable waters), shall be the standards set forth in 40 CFR Part 128, except that for purposes of this section 40 CFR 128.133, shall read as follows: "In addition to the prohibitions set forth in § 128.133, the pretreatment standard for incompatible pollutants introduced into a publicly owned treatment works by a major contributing industry shall be the standard of performance for new sources specified in 40 CFR 414.34: *Provided*, That, if the publicly owned treatment works which receives the pollutants is committed, in its NPDES permit, to remove a specified percentage of any incompatible pollutant, the pretreatment standard applicable to users of such treatment works shall be correspondingly reduced for that pollutant."

Subpart D—Batch and Semicontinuous Process Subcategory

§ 414.40 Applicability: Description of the batch and semicontinuous processes subcategory.

The provisions of this subpart are applicable to process waste water discharges resulting from the manufacture of the following products:

Products	*Process description*
Organic dyes: Azoic Dyes and Components	Batch and semi-continuous processes.

§ 414.41 Special definitions.

For the purposes of this subpart:

(a) The term "phenols" shall mean those components of a waste water amenable to measurement by the method described in 1972 Annual Book of ASTM Standards, Part 23, 1972, Standard D1783–70, page 445.

(b) The following abbreviations shall mean: (i) "BOD5" shall mean five day biochemical oxygen demand; (ii) "COD" shall mean chemical oxygen demand; (iii) "TSS" shall mean total suspended non-filterable solids; (iv) "kg" shall mean kilogram(s); (v) "kkg" shall mean 1000 kilograms; and (vi) "lb" shall mean pound(s).

§ 414.42 Effluent limitations guidelines representing the degree of effluent reduction attainable by the application of best practicable control technology currently available.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged after application of the best practicable control technology currently available by a point source subject to the provisions of this subpart:

Effluent characteristics	*Effluent limitation*
BOD5	Maximum for any one day 15.0 kg/kkg of product (15.0 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 9.0 kg/kkg of product (9.0 lb/1000 lb).
TSS	Maximum for any one day 13.0 kg/kkg of product (13.0 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 7.88 kg/kkg of product (7.88 lb/1000 lb).
Phenols	Maximum for any one day 0.17 kg/kkg of product (0.17 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.088 kg/kkg of product (0.088 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

§ 414.43 Effluent limitations guidelines representing the degree of reduction attainable by the application of best available technology economically achievable.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged after application of the best available technology economically achievable by a point source subject to the provisions of this subpart:

Effluent characteristics	*Effluent limitation*
COD	Maximum for any one day 130.0 kg/kkg of product (130.0 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 65.0 kg/kkg of product (65.0 lb/1000 lb).
BOD5	Maximum for any one day 0.80 kg/kkg of product (0.80 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.40 kg/kkg of product (0.40 lb/1000 lb).
TSS	Maximum for any one day 2.19 kg/kkg of product (2.19 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 1.30 kg/kkg of product (1.30 lb/1000 lb).
Phenols	Maximum for any one day 0.017 kg/kkg of product (0.017 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.0085 kg/kkg of product (0.0085 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

§ 414.44 Standards of performance for new sources.

The following limitations constitute the quantity or quality of pollutants or pollutant properties which may be discharged reflecting the greatest degree of effluent reduction achievable through application of the best available demonstrated control technology, processes, operating methods, or other alternatives, including, where practicable, a standard permitting no discharge of pollutants by a new point source subject to the provisions of this subpart:

Effluent characteristics	*Effluent limitation*
BOD5	Maximum for any one day 1.5 kg/kkg of product (1.5 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.85 kg/kkg of product (0.85 lb/1000 lb).
COD	Maximum for any one day 540 kg/kkg of product (540 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 390 kg/kkg of product (390 lb/1000 lb).
TSS	Maximum for any one day 4.38 kg/kkg of product (4.38 lb/1000 lb). Maximum average of daily values for any period or thirty consecutive days 2.60 kg/kg of product (2.60 lb/1000 lb).
Phenols	Maximum for any one day 0.034 kg/kkg of product (0.034 lb/1000 lb). Maximum average of daily values for any period of thirty consecutive days 0.017 kg/kkg of product (0.017 lb/1000 lb).
pH	Within the range of 6.0 to 9.0.

§ 414.45 Pretreatment standards for new sources.

The pretreatment standards under section 307(c) of the Act, for a source within the batch and semicontinuous processes

subcategory, which is an industrial user of a publicly owned treatment works, (and which would be a new source subject to section 306 of the Act, if it were to discharge pollutants to navigable waters), shall be the standards set forth in 40 CFR Part 128 except that for the purposes of this section, 40 CFR 128.133 shall read as follows: "In addition to the prohibitions set forth in § 128.133, the pretreatment standard for incompatible pollutants introduced into a publicly owned treatment works by a major contributing industry shall be the standard of performance for new sources specified in 40 CFR 414.44: *Provided*, That, if the publicly owned treatment works which receives the pollutants is committed, in its NPDES permit, to remove a specified percentage of any incompatible pollutant, the pretreatment standard applicable to users of such treatment works shall be correspondingly reduced for that pollutant.

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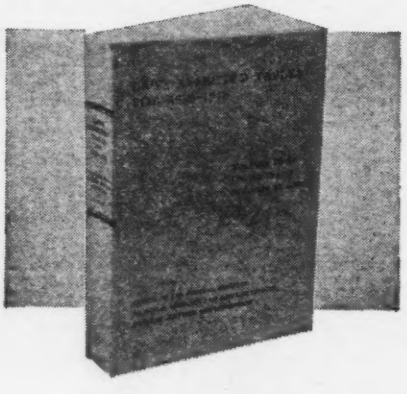
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